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Final Report

Computerized Neuropsychological Screening of Army Aviators
Proposal Number: 1999000234

Daniel K Christensen Ph.D.

Abstract

Problems

1. As described in the mid-term report, initial USAARL participation was withdrawn a few months into the project. (APR00) which required methodological revisions (per WRAMC DCI) due to funding constraints. We also experienced some administrative delays purchasing the commercial software (CogScreen & MicroCog). 2. In addition to the problems mentioned above (and described in the mid-term report in detail) we subsequently experienced a lengthy protocol approval process involving both DCI and MRMC. We also encountered programming difficulties and delays involving ANAM2001. The approximate timeline starting with notification of funding is the following:

JAN00..........Project funded by TATRC JAN00-APR00....Attempted to finalize USAARL support. APR00..........Notified by USAARL that they did not have resources to support this project. JUN00..........Protocol submitted to DCI for approval. AUG00..........WRAMC DCI approval with revisions. OCT00..........CIRO approval. OCT00-APR01....MRMC approval process. APR01..........WRAMC DCI final approval to begin data collection. APR01..........ANAM2001 programming completed to develop USA-ACAT. MAY01..........Ran first subject through protocol at Fort Rucker, AL.

Deliverables

Below are final and pending deliverables.

Final Deliverables: 1. We completed initial development of functioning website titled "US Army Neuropsychology" URL: https://consult.wramc.amedd.army.mil/neuropsych/index4.cfm. This website serves as the system for electronic transmission of neuropsychology data. While we did not originally specify developing a website as the system for electronic transmission of data, this became the logical solution. 2. We completed development of a functioning on-line questionnaire titled "Neuropsychology History Questionnaire- Aeromedical Edition (NHQ-AE)." This on-line questionnaire was developed from the originally proposed hard-copy questionnaire to further enhance the telemedicine aspect of the project. 3. We completed development of a functioning computerized neuropsychological test battery derived from ANAM2001 titled "US Army-Aeromedical Cognitive Assessment Tool (USA-ACAT)," and the ability to download the test to a remote computer. This deliverable is slightly different than, and one step beyond, the proposal in that we did not originally specify a specific test battery to be derived from ANAM2001. Logical analysis of the entire ANAM2001 library of tests, including comparisons to other existing ANAM-derived batteries (e.g., S-CAT and the TBI battery used by the National Rehabilitation Hospital), led our research team to specify a unique battery which we titled USA-ACAT. This battery includes tests thought to be most relevant to this project. In addition, we did not originally specify making the test downloadable from a website. This functionality was a logical addition to the website development. It should be noted that development of USA-ACAT received unfunded support from the Navy by way of CDR Reeves, a research psychologist with a long history with the ANAM. 4. We completed initial development of a database system using a Microsoft SQL7 secure server. We can currently upload data files from USA-ACAT to this secure server and subsequently access the password-protected data. This represents only partial completion of this deliverable. Further work requires analysis of whether it is feasible to utilize the same database system to upload data files from the two commercial off-the-shelf tests (CogScreen & MicroCog).

Pending Deliverables: Deliverables regarding which neuropsychological variables correlate best with flight performance outcome data, which neuropsychological test is best suited for use within Army Aviation, and how to use the test (e.g., screening, baseline, norms development, etc.) are pending completion of data collection and data analysis.

Expenditures

	3Q FY 00	4Q FY 00	1Q FY 01	2Q FY 01	
Element of Resource (EOR)	Apr 1 - May 31	Jun 1 - Sep 30	Oct 1 - Dec 31	Jan 1 - Mar 31	TOTALS
Travel 2100	1,537.26	0.00	1,107.00	0.00	2,644.26
Shipping 2200	0.00	0.00	0.00	0.00	0.00
Rent & Communications 2200	0.00	0.00	0.00	0.00	0.00
Contract for Services 2500	3,600.00	29,250.00	0.00	0.00	32,850.00
Supplies 2600	0.00	0.00	0.00	0.00	0.00
Equipment 3100	3,125.52	3,000.00	627.00	0.00	6,752.52
GRAND TOTALS	8,262.78	32,250.00	1,734.00	0.00	42,246.78

Financials

As noted in the mid-term report we estimated a need to increase our budget by approximately $4,500 in order to hire a necessary research assistant. That made our estimated budget $40,500 as of the mid-term report. Our final budget target is $42,246, which includes the obligated funding for programming of $23,250. Approximately $16,000 of the obligated programming funds has been used thus far.

We feel we will be able to complete the project within the final targeted budget because we have leveraged the WRAMC TMED resources for additional programming and equipment support (e.g., secure server). We were also able to solicit unfunded support from CDR Reeves (a Navy Psychologist) for USA-ACAT development. Finally, our research assistant at Fort Rucker, AL is conducting ongoing data collection within the originally allocated $6,000 budget.

Final Results

Below are final results as well as pending results and implications for AMEDD-wide potential.

Final results: 1. Received final protocol approval in APR01. 2. Completed development of USA-ACAT (derived from ANAM2001) in APR01. 3. Successfully launched the US Army Neuropsychology website in MAY01 for data collection at Fort Rucker, AL. 4. Completed development of the NHQ-AE and successfully used this tool to collect and submit data to a secure server. 5. Successfully downloaded USA-ACAT to an internet-connected, laptop computer at Fort Rucker, AL. The test was administered to subjects in the study and the data files were successfully uploaded to server. 6. Successfully obtained access to the data via the website from WRAMC. 7. Experienced occasional transient problems (e.g., server down temporarily).

Pending results: 1. Determining whether it is feasible to upload data files produced by the two commercial tests CogScreen and MicroCog. 2. Statistical analyses following completion of data collection. Data collection includes collecting outcome data following the checkflight performances of the subjects. 3. Developing a set of recommendations regarding neuropsychological assessment within Army Aviation.

Preliminary implications for AMEDD-wide potential include: 1. Website can provide global access to Neuropsychological Services. 2. Database offers potential for integration with the Virtual Flight Surgeons Office. 3. NHQ-AE can be expanded for general clinical use in Neuropsychological evaluations. 4. Web-based services may be used as a resource in a Psychologist's Field Kit. 5. USA-ACAT can be used to gather cognitive baseline data for all Army Aviators and may have utility for other Army populations.

Projected Costs

Below are four primary future cost considerations to sustain this technology: 1. If substantial growth of the initial database is anticipated, then a full-time database manager (with programming experience) might be required. In addition, maintenance of the website and future enhancements such as development of a more comprehensive on-line history questionnaire will likewise require more manpower resources. 2. Currently, use of USA-ACAT does not incur a cost because it is a DoD-developed test. It is also not anticipated that this test will have a cost in the future. However, the implication of adopting use of CogScreen or MicroCog is much greater because the price range per administration is approximately $8.00 for MicroCog and $20.00 for CogScreen. A final recommendation about which test is best suited for Army use is pending completion of data collection and analysis and will include an analysis of cost as an independent variable. 3. This project offers a logical and valuable extension to the Virtual Flight Surgeon projects currently underway. This is because cognitive abilities assessment is a common decision variable facing flight surgeons who must determine if an aviator may return to flight status due to current medications, environmental exposures, or head injury. The feasibility and cost of integration has not yet been determined. 4. In terms of cost savings, if the results of our project are adopted, such savings may arise from a reduction in aviator trainee expenditures (through earlier identification of trainees who are more likely to have difficulty). Cost savings may also arise from making neuropsychological assessment of aviators more accessible and efficient in remote military locations where neuropsychological expertise is either not locally available or currently requires air-evacuation or referral to the local economy. 5. Advances in the ANAM applications further offer potential support for a range of operational settings. This includes baseline cognitive evaluations for deployments to allow quantification of cognitive change that may have occurred, and for ongoing physiologic monitoring with the future Warfighter Physiologic Status Monitor.

Comments

No additional comments.

TATRC Scientific Review

TATRC Acquisition Review

Supporting Graphs/Charts

No Attachments